Straw as bedding or in feed increases unsaturated fats in belly fat

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Pigs with access to straw either as bedding and/or via their diet deposit less fat in their belly than pigs without access to straw (Trezona *et al.*, 2007). There are at least two possible mechanisms for this. First, if pigs consume straw in addition to their food the energy density of their total intake may be less and this may depress their voluntary energy intake and lower the deposition of fat. Second, if pigs lie on straw that insulates them better they may respond by depositing less fat in the areas that are in contact with the ground. If less fat is deposited because endogenous synthesis is reduced then it is likely that the fatty acid (FA) profile of the fat will change and become less saturated.

Ninety-six Large White x Landrace female pigs were stratified by live weight (16.1±0.26 kg) at eight weeks of age into groups of six and housed in commercial grower-finisher pens within a naturally ventilated shed. The experiment was a 2x2 factorial design with two dietary treatments, i) CD (grower and finisher diets) and ii) SD (grower-finisher diets fortified with 10% wheat straw) (calculated analyses were as reported by Trezona *et al.*, 2007), and two floor treatments: i) CF: partially-slatted concrete floor and ii) SF: straw bedding as flooring (~15 cm thick). At 24 weeks of age pigs were slaughtered at a commercial abattoir. Belly fat was collected at the ventral midline from the hot carcass of 12 pigs per treatment and stored at -80°C until FA profiles were determined via gas chromatography. Data were analysed by two-way ANOVA (Genstat v8).

Table 1. Effect of straw, as bedding and in the diet, on the fatty acid profile of belly fat in 24-week-old gilts (see text for explanation of treatment acronyms)

						P		
Fatty acid (%)	**SD-CF**	**SD-SF**	**CD-CF**	**CD-SF**	**SEMa**	**Diet**	**Floor**	**D*F**
Myristic (C14:0)	2.0^{b}	1.9^{a}	1.9^{a}	2.0^{b}	0.04	0.949	0.693	0.049
Palmitic (C16:0)	25.0	24.4	24.8	24.8	0.31	0.796	0.374	0.424
Palmitoleic (C16:1)	3.0	3.1	3.0	3.1	0.11	0.689	0.283	0.946
Stearic (C18:0)	14.0	13.0	14.2	13.5	0.43	0.444	0.062	0.766
Oleic (C18:1)	31.6^{a}	32.5^{b}	32.8^{b}	33.0^{b}	0.30	0.007	0.063	0.252
Linoleic (C18:2)	18.1^{bc}	18.7^{c}	17.2^{a}	17.5^{ab}	0.46	0.029	0.362	0.819
α-Linolenic (C18:3 n3)	1.9^{ab}	2.0^{b}	1.8^{a}	1.8^{a}	0.05	0.049	0.416	0.863
γ-Linolenic (C18:3n6)	0.078	0.071	0.066	0.066	0.005	0.086	0.486	0.486
Saturated:Unsaturated	0.734	0.685	0.733	0.710	0.0181	0.520	0.055	0.485

[a]SEM = pooled standard error of mean

The lower percentage of stearic acid (P = 0.06), the higher percentage of oleic acid (P = 0.06) and the lower ratio of total saturated to unsaturated FA (P = 0.05) all suggest that pigs bedded on straw deposit more unsaturated FA. When pigs were given straw mixed into their diet unsaturated FA in the belly also increased as shown by the higher levels of oleic (P = 0.007), linoleic (P = 0.03) and linolenic acids (P = 0.05). The finding that straw provided either as bedding or consumed directly by pigs changes the FA profile in belly fat is important for the Australian pork export market because in Asia the belly is a premium cut. While increasing the levels of unsaturated fat in the belly may help in the advertising of healthy pork, it may also be a disadvantage because higher levels of unsaturated FA are associated with softer fat that can be more prone to off flavours because of rancidity.

Supported in part by Australian Pork Limited.

References

TREZONA, M., MULLAN, B.P., PLUSKE, J.R., PETHICK, D.W., DUNSHEA, F.R. and D'SOUZA, D.N. (2007). In "Manipulating Pig Production XI" p.47 eds. J.E. Paterson and J.A. Barker. (Australasian Pig Science Association: Werribee).